

Abiotic Formation of the Sugar of DNA

2-Deoxyribose —the sugar component of DNA (deoxyribose nucleic acid) — were produced from the ultraviolet irradiation of water and methanol ice mixtures under simulated astrophysical conditions.

- Experiments conducted in the Astrochemistry Laboratory at NASA Ames Research Center demonstrated that the ultraviolet irradiation of water and methanol ice mixtures at very low temperature (-440°F) leads to formation of 2-deoxyribose (the sugar of DNA), together with other sugar-like compounds, including ribose (the sugar of RNA). This is the first detection of 2-deoxyribose in such experiments.
- These experiments aim to simulate chemical processes in cold astrophysical environments such as interstellar molecular clouds and protostellar disks.
- 2-Deoxyribose was also searched for in samples of meteorites, but its presence could not be confirmed. However, other simpler deoxysugar-like compounds were found in these meteorites.



- The presence of sugar-like compounds, including ribose and 2-deoxyribose, as well as several other compounds of biological interest such as amino acids (the building blocks of proteins) and nucleobases (the building blocks of the genetic material) in primitive meteorites suggests that some of the compounds from which life emerged on the Earth may have been delivered via asteroids and comets.

Peer-reviewed publication: Nuevo, M., et. al, *Nature Communications*, **9**, 5276 (2018)

NASA feature: <https://www.nasa.gov/feature/ames/sugar-is-sweet-essential-to-life-and-its-probably-in-deep-space>